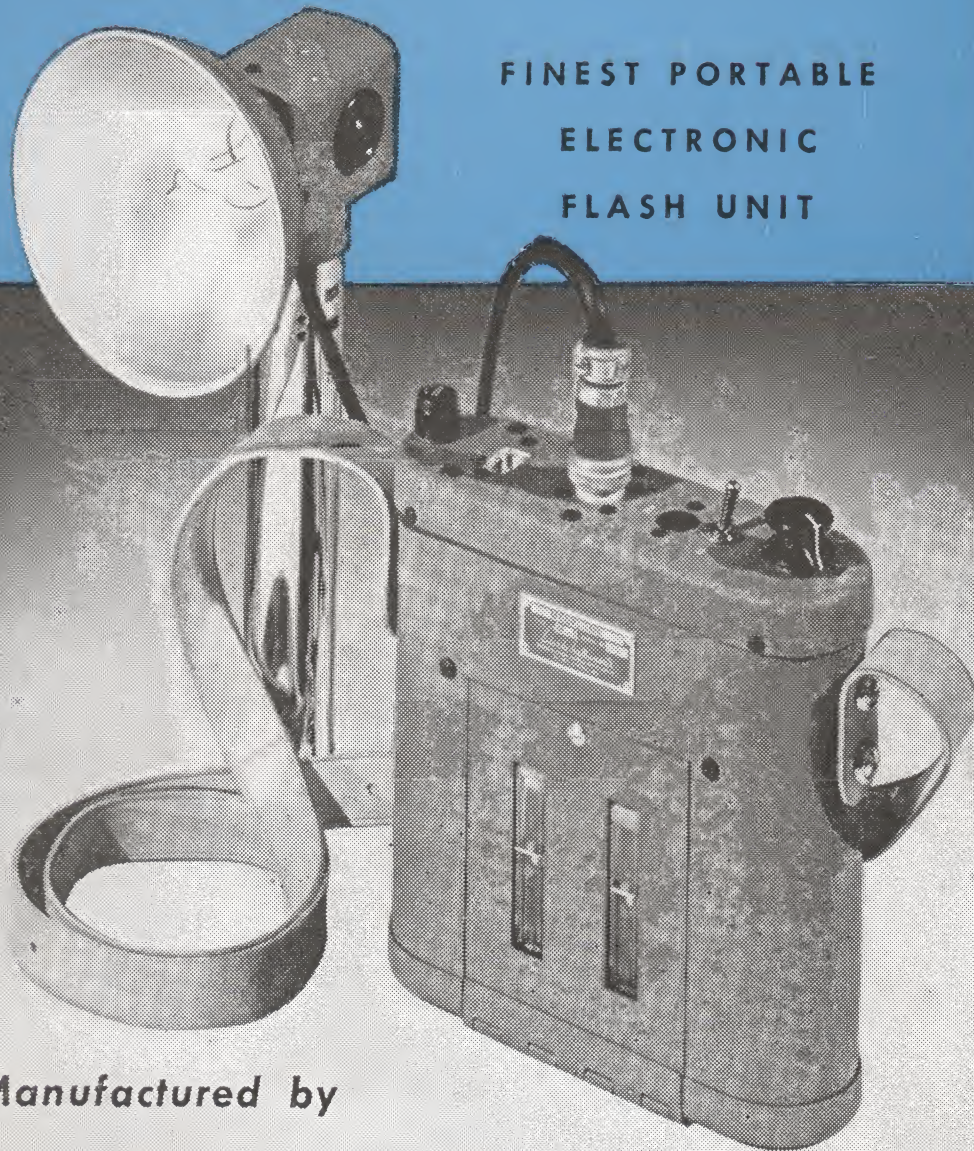


INSTRUCTION BOOK

for the

Megalume 1®

FINEST PORTABLE
ELECTRONIC
FLASH UNIT



Manufactured by

Clarke Instruments

DIVISION OF

NATIONAL ELECTRICAL MACHINE SHOPS, INC.
919 JESUP BLAIR DRIVE, SILVER SPRING, MD.

W A R N I N G !

Postal Regulations prohibit the shipment of batteries containing acid through the mail without extensive precautionary packing.

If, for any reason, the Megalume I must be returned to the factory, remove and retain the battery.

The manufacturer assumes no liability for any damage caused by the shipment of a Megalume I with battery.

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SPECIFICATIONS

COMPLETE EQUIPMENT

- (1) Power unit with leather carrying strap
- (2) Flash head with connecting cable
- (3) Power cord
- (4) Battery, Willard Type ER-6-4B
- (5) Battery solution, 6 oz. bottle,
1.280 specific gravity, with battery filler
- (6) Instruction book

SHOULDER WEIGHT

With battery installed for portable
operation 7 lbs. 7 oz.

TOTAL WEIGHT

Including flash head 8 lbs. 2 oz.

OVER-ALL SIZE

Height 8-3/8 in.

Width 8-1/4 in.

Thickness 2-1/2 in.

POWER SUPPLY

- (1) 4-volt storage battery
- (2) 117-volt A.C., 50 to 60 cycles

A-C POWER REQUIREMENTS

- (1) Peak 60 watts
- (2) Stand-by Less than 10 watts
- (3) Charge Less than 10 watts

ENERGY STORAGE 100 watt seconds

RECHARGE TIME

- (1) A-C operation
 - (a) Within 1 F stop of full
charge 3 1/2 seconds, approx.
 - (b) Within 1/2 F stop of full
charge 6 seconds, approx.
- (2) Battery operation
 - (a) Within 1 F stop of full
charge 5 seconds, approx.
 - (b) Within 1/2 F stop of full
charge 8 seconds, approx.

LIGHT OUTPUT, MINIMUM

Measured with Type 1501-A Gen-
eral Radio Integrating Light
Meter 190 lumen seconds per square foot at 4
feet. 3000 beam candle power seconds

I

Introduction

The MEGALUME I is an electronic photoflash unit built to the highest possible standards and marketed solely on the basis of its engineering features. It is produced by a company with more than 40 years' experience in the manufacture of the highest-quality electronic and communications equipment for use by the Armed Services.

In the design of the unit, the only considerations were quality and performance, and no compromises were made for the sake of making the unit competitive in a price market. Careful consideration has been given to all of the engineering aspects of design so necessary for long life and user satisfaction.

This instruction book is in two parts. The first part is confined wholly to operating instructions. The second portion of the book has to do with such servicing as the average user may want to take care of himself.

II. PREPARATION FOR USE

1. CONTENTS OF CARTON.—One each of the following items will be found in the carton when it is opened:

- Flash head with connecting cable
- Power pack
- AC power cord
- Storage battery
- Instruction book

2. FILLING THE BATTERY.—Your dealer has available already mixed battery solution, supplied to him with his purchase of the MEGALUME I, but shipped separately.

The first step in preparing the instrument for use is to fill the storage battery with the solution provided. Usually your dealer will be glad to do this for you. If, however, this is impossible for some reason, it can easily be done by you. Follow the step-by-step filling instructions.

a. Using a screwdriver, operate the flush catch on the battery compartment by turning it one-quarter turn counter-clockwise. Open the battery compartment door. (*Fig. 1*)

b. Remove the battery from the battery compartment and remove and destroy the seals which cover the vent openings. (*Fig. 1-A*)

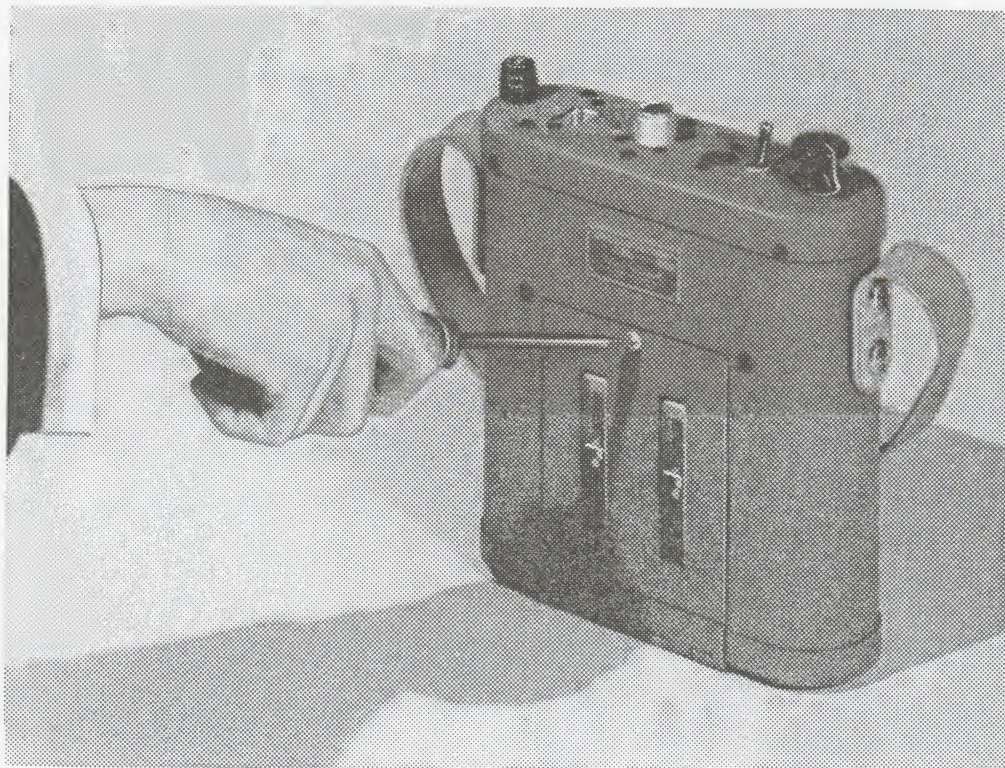


FIGURE 1

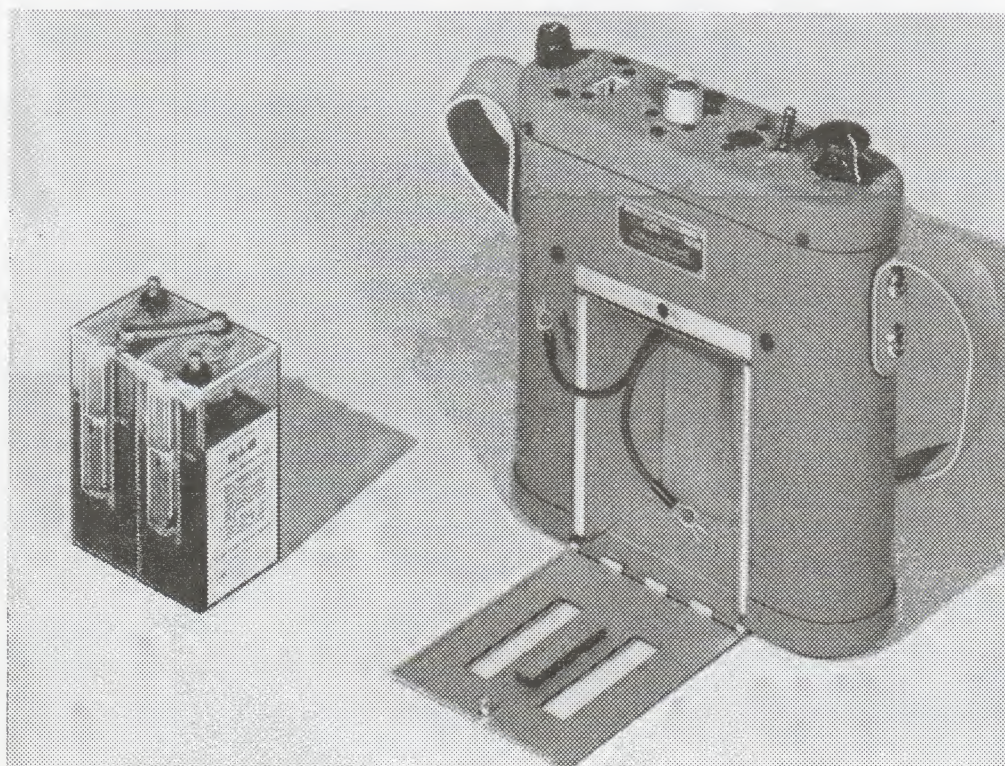


FIGURE 1-A

c. Using the syringe packed with the bottle of 1.28 specific gravity battery solution, fill each cell $1/8$ inch above the "Liquid Level" line marked on the side of the battery case. *Be sure that the spout on the syringe is inserted through the hole in the bottom of the trap compartment before squeezing the bulb.* No liquid should be in the trap. The plates and separators of the battery will soak up some liquid, and initial filling about $1/8$ inch above the line will insure adequate level after this absorption takes place. Observe the precautions on the box containing the battery solution. Take every precaution to see that no acid is spilled on top of the battery during the filling process and that there is no trace of battery acid on the top when the battery is placed in its compartment. (Fig. 1-B)

d. *The red lead from the power pack should be connected to the battery post marked "POS."* The black lead should be connected to the post marked "NEG". Place the battery in its compartment, making sure that the leads lie on top of the battery and are not pinched between the back of the battery and the back wall of the compartment. (Fig. 1-C)

e. Close the door and fasten the catch by turning it one-quarter turn clockwise.

f. Access to the compartment is necessary only when the liquid level shows below the mark. Then, add only distilled water to the battery. When checking the liquid level, make sure that the MEGALUME I power supply is in an upright position and is not tilted.

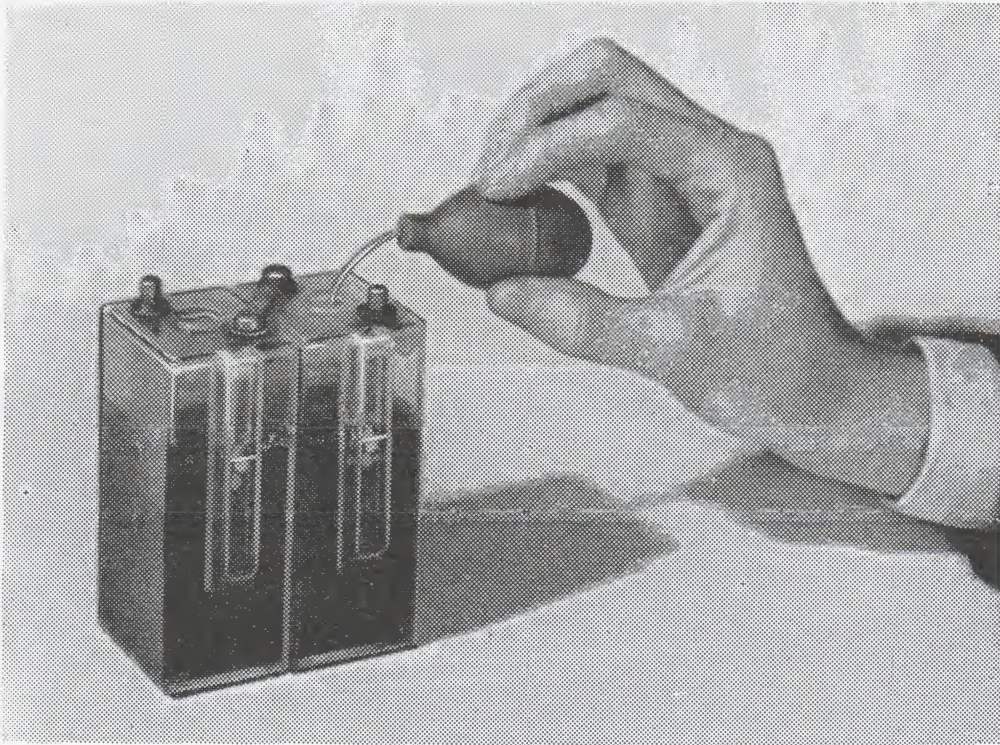


FIGURE 1-B

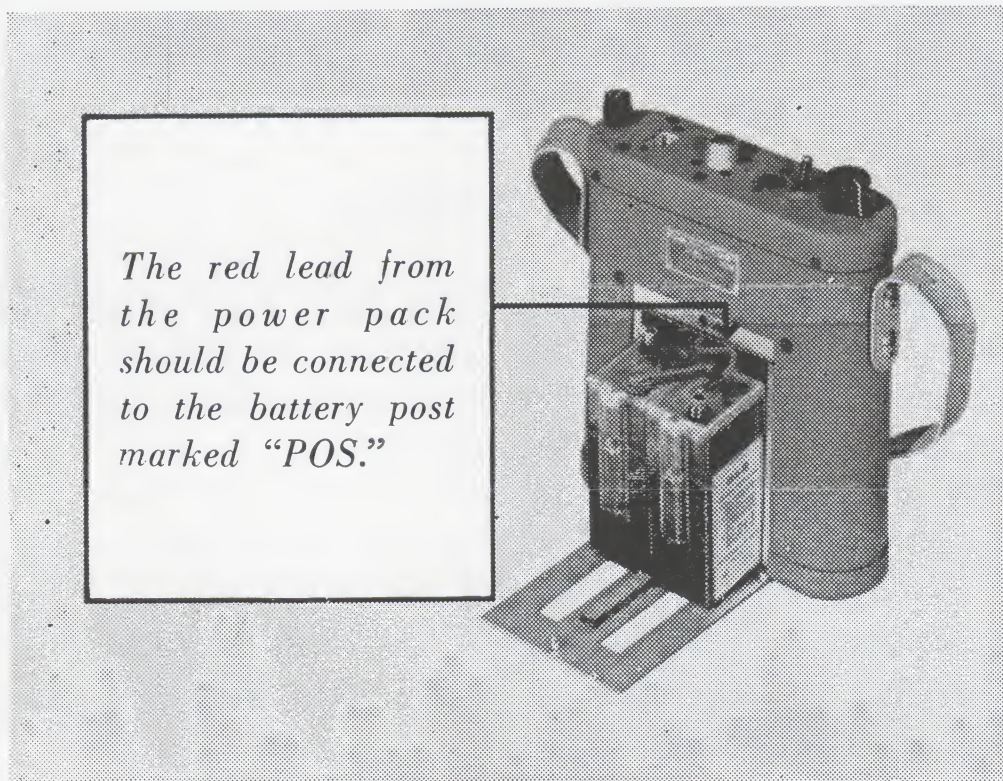


FIGURE 1-C

3. CHARGING THE BATTERY.—The three colored balls on the side of the battery are used to indicate the condition of charge of the battery. When all three balls float at the top of the slot, the battery is fully charged. When all three balls are at the bottom of the slot, the battery is completely discharged. As the battery is discharged, first the green, then the white, and then the red ball sinks, showing the progressive stages of discharge and the condition of the battery at all times.

The MEGALUME I contains its own battery charger. *Before putting the unit to use, the battery should be charged.* Plug in the a-c cord, throw the selector switch to "CHG." and the toggle switch to 'ON' and allow the battery to charge for 20 hours. The built-in charger will be a great convenience as compared to the use of a separate external charger, and is one of the features MEGALUME I users appreciate the most.

III. OPERATION

After charging, connect the flash head with the power supply by screwing together the mating parts of the connector. With the a-c cord still connected to the unit, throw the selector switch to "A C." In a few seconds the lamp on the rear of the head will begin flashing, indicating that the condensers in the unit are nearly fully charged and ready for use. The head may be flashed either by pressing the button on the back of the unit or by the synchronizing contacts in the camera.

The markings around the selector switch on top

of the power supply are fully descriptive. On "CHG." the battery is being charged. It is, of course, necessary to have the a-c cord connected. On the position marked "A.C." the unit is ready to operate from a 117-volt a-c power supply when the a-c cord is connected. On "BAT." the MEGALUME operates from its own internal four-volt storage battery. The switch marked "ON-OFF" functions as marked for each of the three positions of the selector switch. For example, when charging the battery, the switch must be in the "ON" position. The switch should be in the "OFF" position whenever the unit is not being used. This is particularly important to conserve energy when battery operation is employed.

No cable is supplied with the MEGALUME I to connect the flash head to the user's camera, because of the lack of standardization of connectors used for this purpose. Your photographic dealer carries in stock connecting cables to fit your particular camera, and the cable should be procured from him. If you have been using one of the standard types of flash equipment using bulbs, you may find that your present cable is adequate, since the receptacle on the MEGALUME I head is standard.

The MEGALUME I flash head is designed to fit on any 1½" diameter tube. This size is standard with most manufacturers of flash equipment designed for use with flashbulbs. The old reflector should be removed and the MEGALUME I head placed in position. If your camera has a solenoid-operated shutter, you can either leave the normal photoflash batteries in the battery case and use them to operate the shut-

ter, or you can make use of another of the MEGALUME's features. The connector marked "BAT.", on top of the power supply case, makes available four volts at a high discharge rate, which can be used to operate your solenoid. On flashgun tubes which have a side outlet normally used to supply a focus spot, it is only necessary to connect a special cable, available from your dealer, between this outlet and the "BAT." outlet on top of the MEGALUME power supply case. In doing this, always make all outside connections *before* inserting the plug in the "BAT." receptacle on the power supply. With this arrangement, assuming a solenoid-operated shutter having internal (X) contacts, all the convenience of operation usually found on press cameras is retained, and the photographer has nothing new to learn. He simply pushes the switch that he is accustomed to use, the solenoid is tripped, and the shutter contacts set off the MEGALUME I flash.

For camera owners who do not have a flashgun employing a battery holder having the required $1\frac{1}{2}$ " diameter, there is available from your dealer a universal mounting bracket and tube which will enable the MEGALUME I flash head to be attached to virtually any camera.

IV. EXPOSURE

Assuming that you are ready to go, the next step is to determine what exposure guide numbers you should use. The following table (Fig. 2) is conservative and is based on extensive sensitometric tests. Tests to determine what, if any, exposure and gamma changes take place when the MEGALUME I

source is used, as compared to daylight and tungsten sources, indicate:

1. The gamma for all black and white films (high speed as well as medium speed) is reduced approximately 10% when the MEGALUME I is used. This is due to its shorter exposure time ($1/2500$ sec.) and its daylight color quality (higher contrast is obtained with red light sources). To produce the same gamma and, therefore, the same printing characteristic as is obtained with flashbulbs, one should increase the development time for black and white films 15% to 20%.

2. The correct guide number is approximately the same as the film manufacturer recommends for a #5 flashbulb perfectly synchronized at $1/50$ second.

The guide numbers shown can, of course, be used as a starting point for any experimenting the MEGALUME I user wants to do on his own.

Figures 3 and 4 are curves relating film speed with the guide number to be used with the MEGALUME I. Please note that the guide numbers for color films are based on the use of color correction filters, which although not usually used with electronic flash units, may be considered desirable by those perfectionists who demand the last word in color rendition. Since these filters have such a small filter factor, the stated guide numbers can be used when they are omitted. Of course, these guide numbers, particularly for color, presuppose that the manufacturers hold their emulsions to their rated speed. Experienced users of color film, however, will, of course, recognize that this is not always the case, as some types and some

EXPOSURE TABLE

(FIGURE 2)

| <i>Type</i> | <i>Daylight Speed</i> <i>Color Films</i> | <i>Guide No.</i> |
|-------------------------------|---|------------------|
| <i>ANSCO</i> | | |
| Ansco Color | 10 | 45 |
| <i>EASTMAN</i> | | |
| Ektachrome | 8* | 40* |
| Kodachrome | 10 | 45 |
| Kodacolor | 25 | 70 |
| | <i>Black and White Films</i> | |
| <i>ANSCO</i> | | |
| Isopan | 50 | 120 |
| Supreme | 50 | 120 |
| Superpan Press | 125 | 190 |
| <i>DUPONT</i> | | |
| High Speed Pan Type 428 | 160 | 215 |
| Arrow Pan | 160 | 215 |
| X-F Pan | 64 | 135 |
| Fine Grain Pan | 32 | 96 |
| <i>EASTMAN</i> | | |
| Royal Pan | 200 | 240 |
| Super Panchro Press Type B | 125 | 190 |
| Super XX | 100 | 170 |
| Plus X | 50 | 120 |
| Portrait Pan | 50 | 120 |
| Panatomic X | 32 | 96 |
| Infrared (standard type) | | |
| with No. 25, 29, or 70 filter | 20 (tungsten) | 60 |
| <i>POLAROID</i> | | |
| Type 41 | 100 | 160 |

*This value should be modified according to instructions packed with the film.

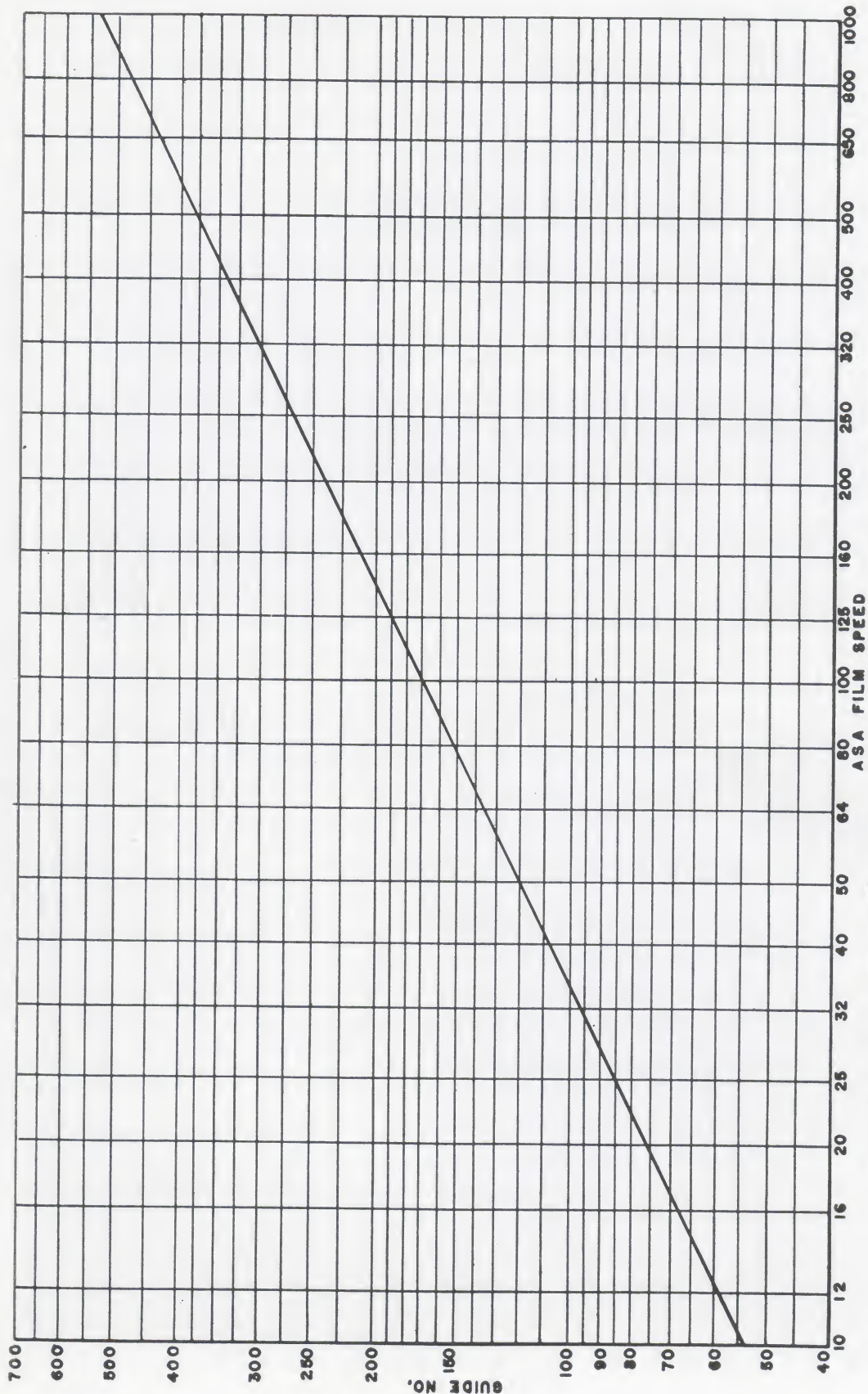


FIGURE 3 - BLACK & WHITE GUIDE NUMBERS FOR USE WITH THE MEGALUME I

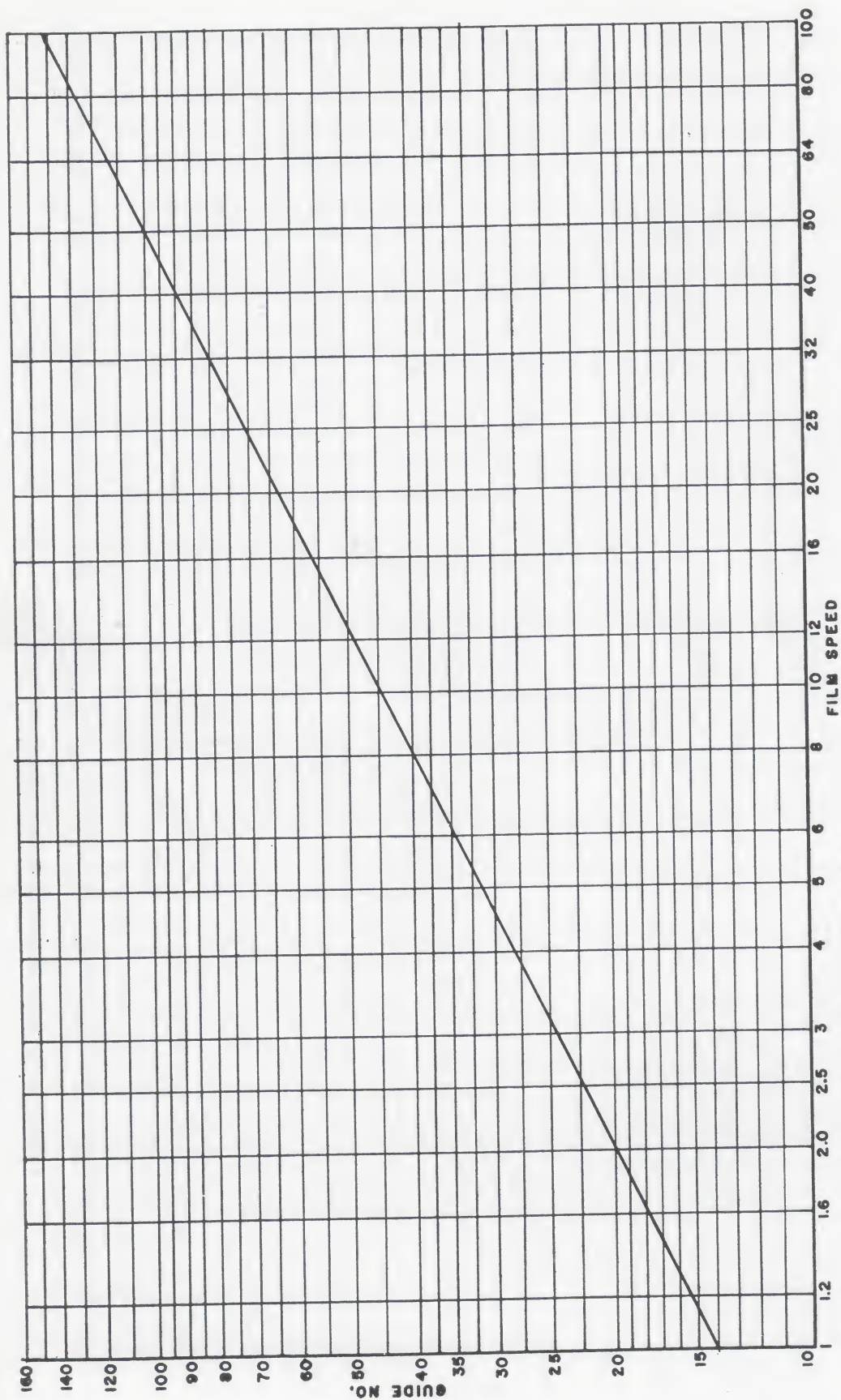


FIGURE 4--DAYLIGHT COLOR FILM GUIDE NUMBERS FOR USE WITH THE MEGALUME I

makes of color film vary widely in their speed from emulsion to emulsion. Where the manufacturer gives information on each emulsion number, showing the deviation of that particular film from normal, suitable corrections should, of course, be made in the guide number used.

In our sensitometric tests, the MEGALUME I produced almost identical results with daylight color film as a #5 blue flashbulb on *open flash*. This was true of all color film tested, indicating negligible reciprocity law failure with modern color films.

V. LIGHT OUTPUT

The light output, in lumen seconds per square foot at 4 feet, of every MEGALUME I is accurately measured at the final inspection position in three directions: Head on, and 25 degrees each side of center. Fig. 5 is a plot of the directivity of the MEGALUME I reflector.

VI. RECHARGE TIME

Fig. 6 shows the recharge time of the MEGALUME I for both battery and A-C operation. From these curves it can be seen that the unit recharges to within $\frac{1}{2}$ stop in 6 seconds on A-C operation and in 8 seconds when operated with its internal battery.

VII. PRECAUTIONS

If operated in temperatures below freezing, the output of the MEGALUME I will be materially reduced. This reduction in output occurs only if the

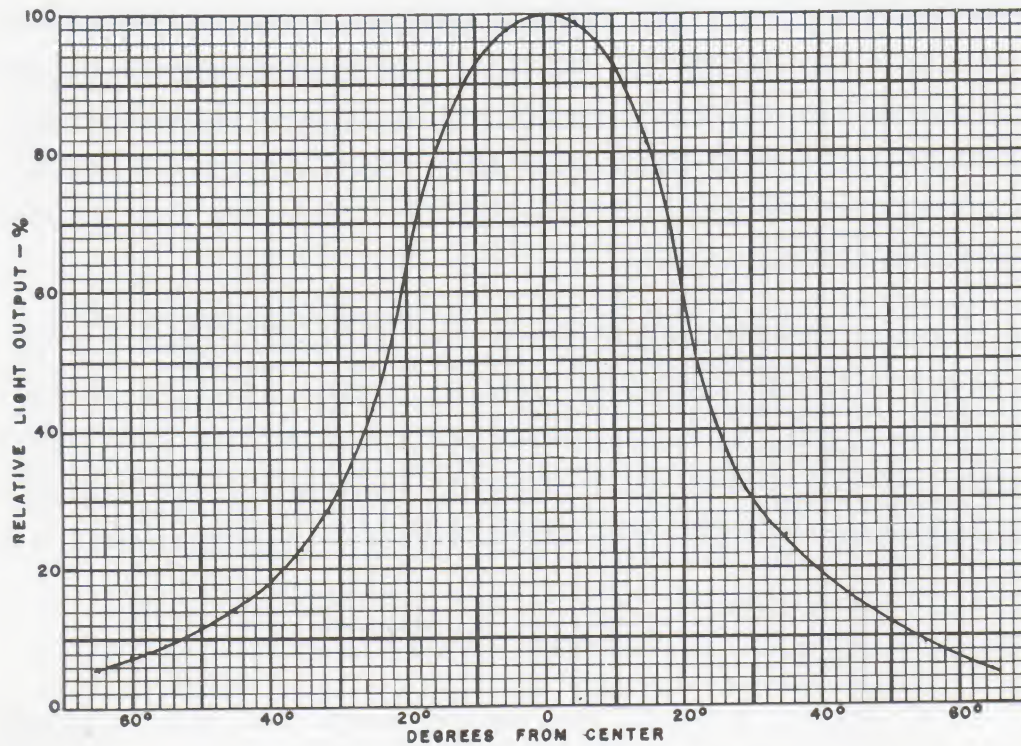


FIGURE 5-MEASURED LIGHT DISTRIBUTION FOR MEGALUME I

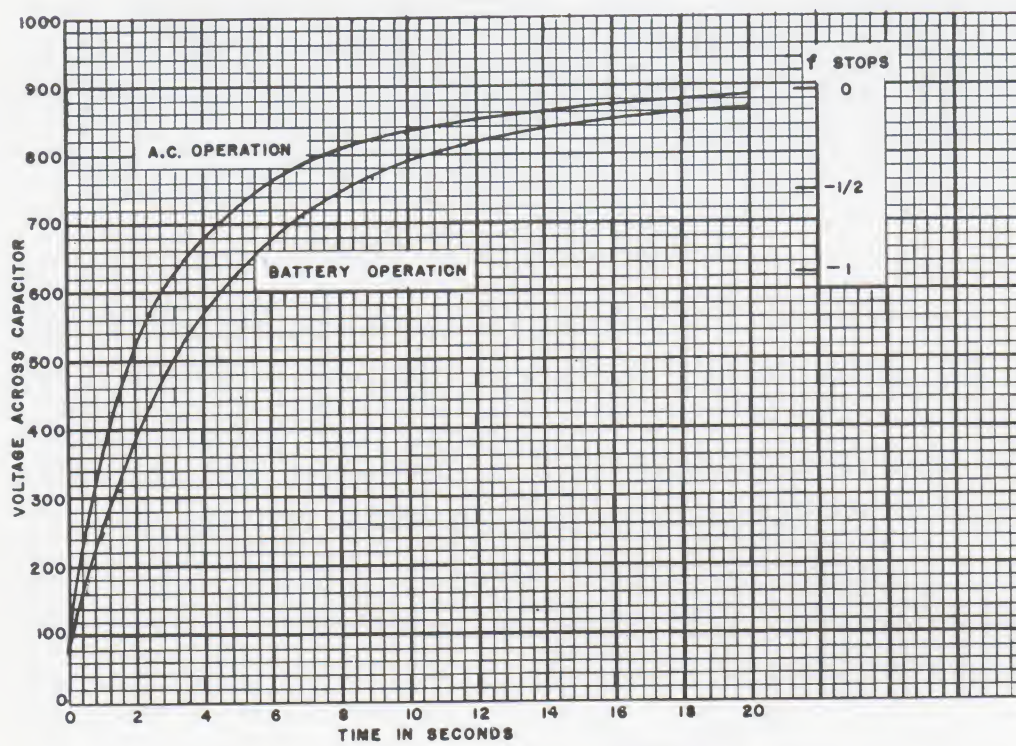


FIGURE 6-RECHARGE TIME CURVES FOR MEGALUME I

entire unit has become chilled to below freezing. It obviously does not apply if the unit is taken outdoors for a short period of time from a warm location.

The batteries should always be kept fully charged, even when the unit is not being used regularly. The battery must, by all means, be kept fully charged if the unit is exposed to temperatures below freezing.

It is not desirable to discharge the condensers by flashing the lamp after a period of use. The unit should be put on the shelf with the batteries fully charged and the condensers charged, ready for use. The condenser charge will gradually leak off when the unit is not being used. If the unit is kept inactive for any long period of time, it is desirable to charge up the condensers occasionally. After a period of prolonged idleness, the unit should be operated for a period of at least ten minutes before flashing in order to allow the condensers plenty of time to reform. Failure to do this will result in reduced light output for the first few flashes.

VIII. USER SERVICING

It is not recommended that the user make any except minor repairs or replacements on the unit unless he has considerable experience in electronic circuitry and is fully conversant with the safety precautions necessary when the unit is out of its case. The only work that we recommend to be done by the average user is the following:

1. Replacement of the fuse.

2. Filling the battery.

For other than these operations we urge the user to take the unit to his dealer's service department or to return the unit to the factory, where prompt and economical service can be performed. If, as an emergency measure, the user finds it necessary to replace the vibrator, instructions are given below for this operation. Although it can be done by the user if the precautions stated are followed, we recommend that you let your dealer or service man do it if his service is available.

1. REPLACEMENT OF THE FUSE.—Fuses are not ordinarily provided on photoflash equipment. However, some instances have been reported where users have tried to operate the instrument or charge the battery when connected to a direct-current outlet. If the MEGALUME I is used on any but the proper circuit, the fuse will blow. The fuse can be replaced simply by pressing down on the black top and turning in the direction of the arrow, then lifting out the fuse after the bayonet lock becomes disengaged. The replacement fuse should be a .5 ampere (slow blow) type, available at any radio supply dealer. A new fuse is inserted by pushing down on the cap and turning in the direction opposite to the arrow.

2. FILLING THE BATTERY.—The liquid level in the battery should be kept to the lines shown by the addition of distilled water. Use the small syringe furnished with the battery for this purpose. Refer to page 4 for detailed battery filling procedure.

3. REPLACEMENT OF THE VIBRATOR.—The vibrator used is a Type W659 or W859 Mallory unit. The normal source for these units is your nearest radio supply store. In case this vibrator cannot be readily obtained, the following types can be used as emergency replacements:

Cornell-Dubilier 5301

Radiart 5301

Mallory 859

ATR 340

James J2SP

To replace the vibrator it is necessary to go inside the unit. It is important that before any work is done on the interior of the unit, the condensers be fully discharged. If the unit has been turned off for at least one hour, the condensers will, in all probability, be discharged. If it is inconvenient to leave the unit off for this period of time, it should be switched to AC operation and the condensers charged; and then with the AC plug removed and the switch in the OFF position, the unit should be flashed to discharge the condensers. After the unit has been flashed, there still remains a residual charge in the condensers, which will be dissipated in approximately 15 minutes' time. After the above precautions have been taken, proceed as follows:

- a. Open the battery door, take out the battery, and disconnect the wires from its terminals.
- b. Make sure the AC cord is disconnected from

the unit and that the switch is in the "OFF" position.

- c. Wait at least 10 minutes before opening the unit.
- d. Remove the four screws holding the top on the power supply and lift the top up with a slow, even pull. *DO NOT TOUCH ANY EXPOSED PART OF THE WIRING OR COMPONENTS.* Do not jerk. The vibrator is readily accessible and may be easily removed and replaced.
- e. Replace the top of the unit and reconnect the battery.

POWER SUPPLY—(Exploded View)

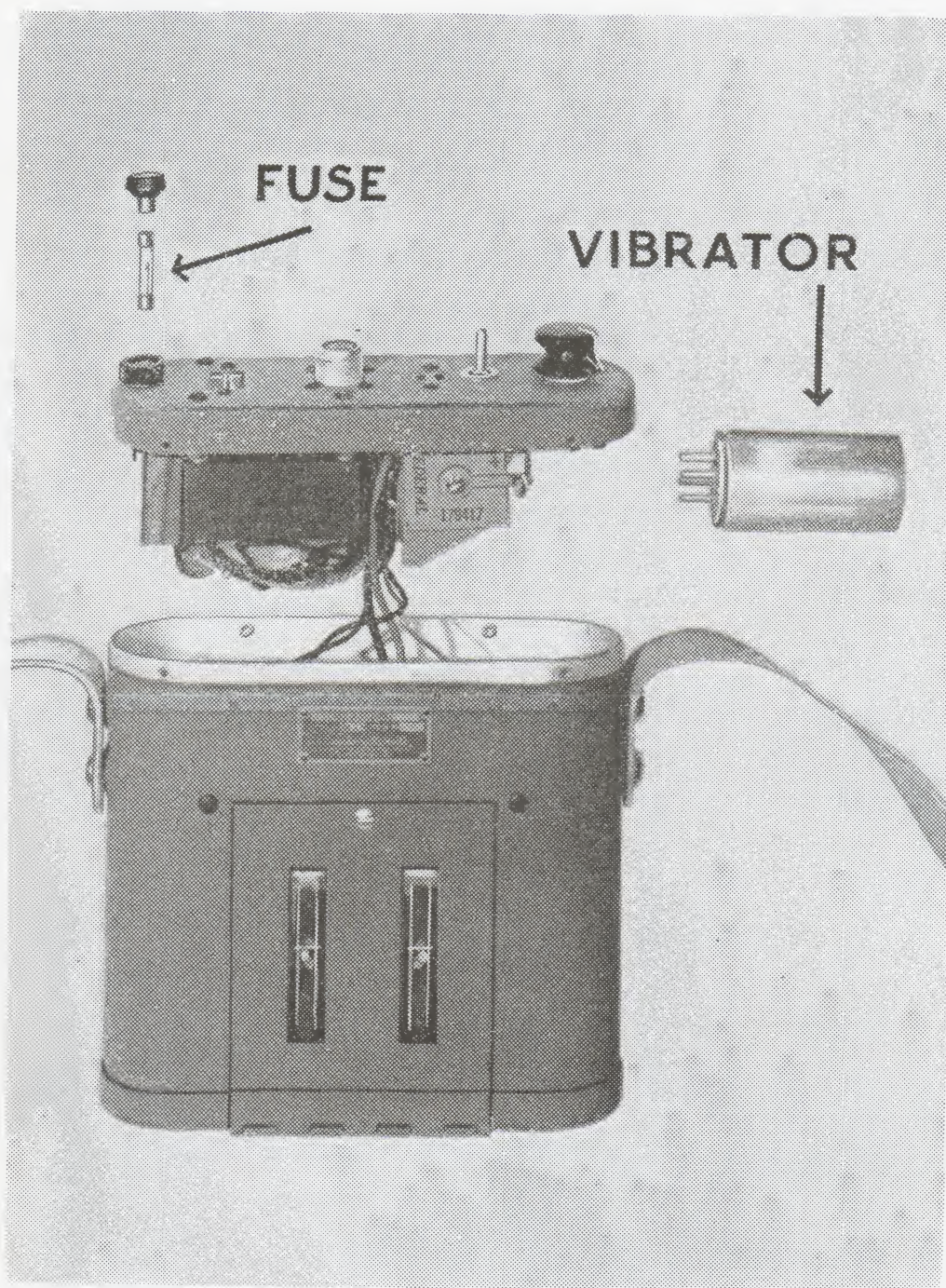


FIGURE 7

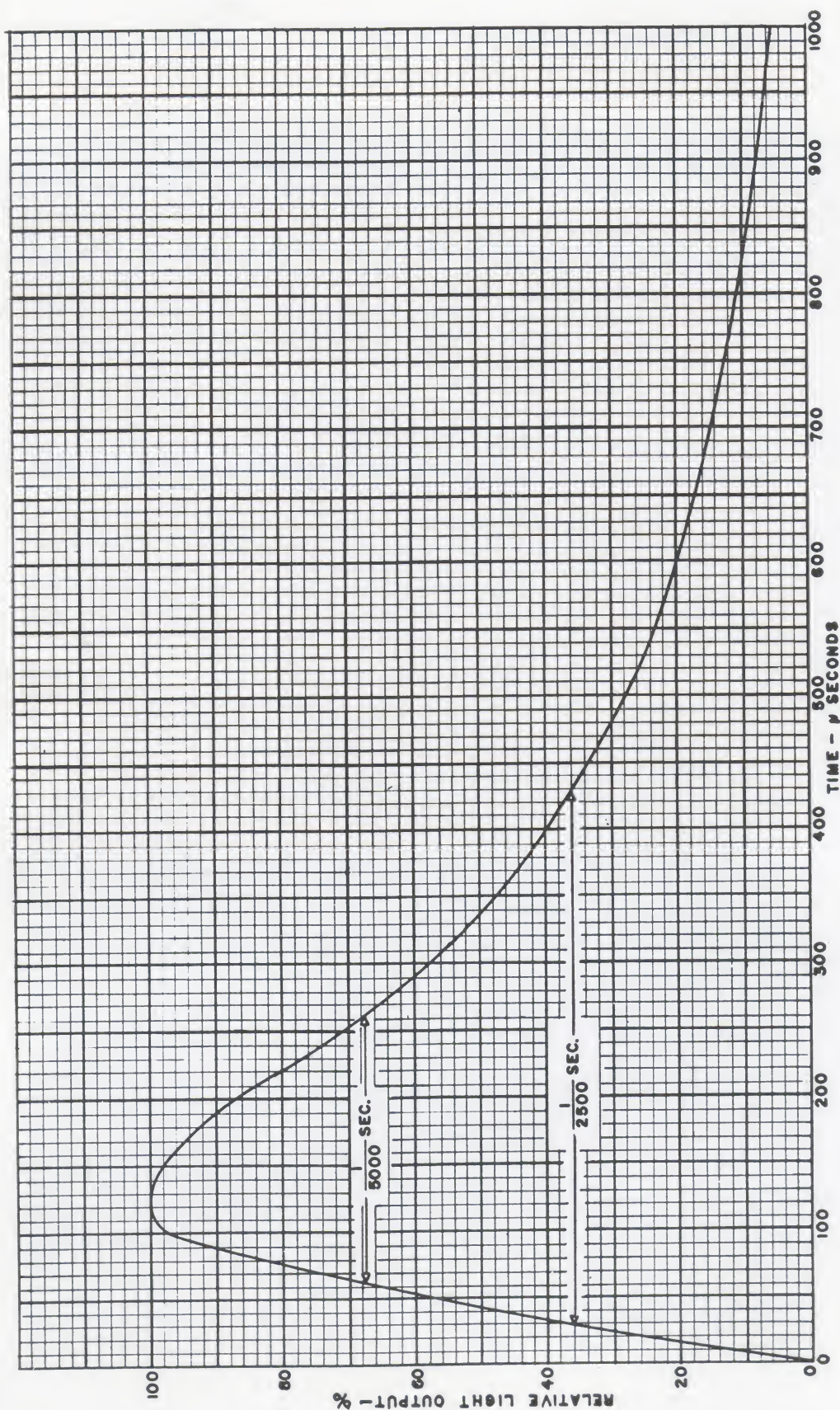
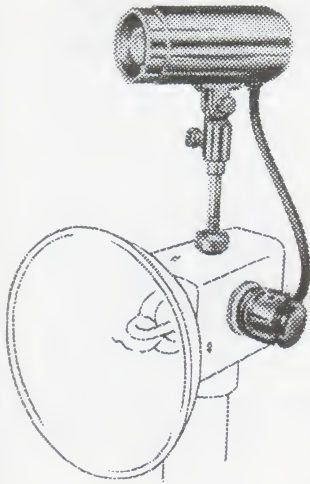


FIGURE 8 - LIGHT DURATION CURVE FOR MEGALUME I

Megalume Accessories

MEGATRIPPER



This slave unit provides remote synchronized firing of an additional MEGALUME. It operates on the light output of the MEGALUME that is fired by the camera shutter thus requiring no interconnecting cables. The MEGATRIPPER has been designed to operate in a high level of ambient light both in the studio and/or short distances outside. It mounts simply on the slave MEGALUME lead in a socket designed for the purpose and can be aimed at the master light or to the subject for reflected light operation. Any number of additional MEGALUMES may be used in multiple flash if each is equipped with a MEGATRIPPER.

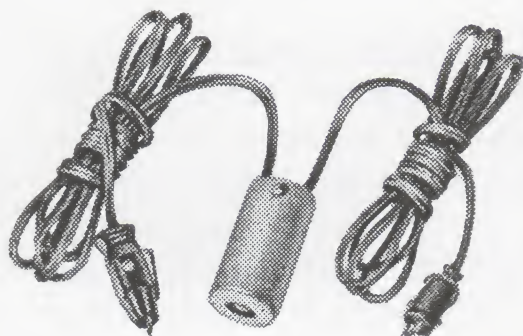
FILTER HOLDER

Used to support a 5½ inch filter in front of the MEGALUME flash head, the filter holder has been especially designed for the critical worker who does not wish to reduce the definition of his pictures by adding a filter to his lens. Useful in obtaining special effects in multiple flash with different color filters. It is also quite useful in color photography outdoors when the MEGALUME is used to supplement daylight. In the latter case, a color correction filter is installed on the flash head to match its color quality to that of daylight.



Megalume Accessories

CHARGING ADAPTER



With this adapter, the MEGALUME battery can be recharged from the cigarette lighter outlet of your automobile. This is especially convenient when traveling and there is no source of AC power available. The adapter also allows the photographer to charge his MEGALUME

battery while traveling to or between jobs, and thus increase the number of flashes available from his MEGALUME in one day.

Since there are four classes of battery systems in use in American cars, the following four models of the charging adapter are available.

Model 6N—for cars with a 6 volt battery and the negative terminal grounded.

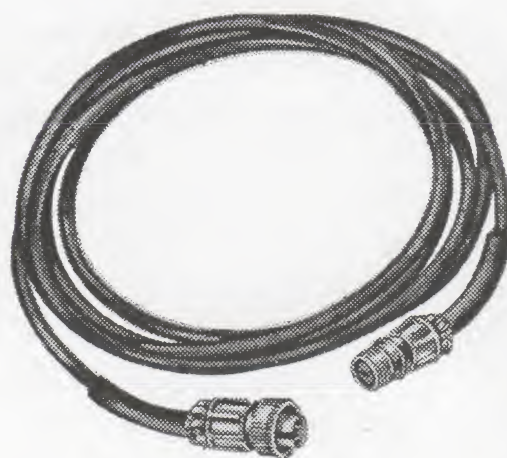
Model 6P—for cars with a 6 volt battery and the positive terminal grounded.

Model 12N—for cars with a 12 volt battery and the negative terminal grounded.

Model 12P—for cars with a 12 volt battery and the positive terminal grounded.

EXTENSION CORD

The cord is 10 feet in length thus allowing the MEGALUME power pack to be placed an additional 10 feet away from the flash head. This is particularly useful for studio work where it is desirable to have the power pack on the floor and out of the way while the flash head is mounted on a stand. No adjustment in exposure is necessary when this cord is used.





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Complete, less battery \$151.35